

Contracts, Markets, and Prices

Organizing the Production and Use of Agricultural Commodities

Chapter 1

Introduction

Farmers have long used formal contracts in obtaining land, credit, and equipment, as well as in organizing the production and marketing of commodities such as vegetables for processing. Formal contracts now cover a growing share of agricultural production, a growth closely tied to shifts in farm size, product differentiation, and product monitoring.

As U.S. agriculture evolves, farms are getting larger, and many farm enterprises are becoming more specialized. Farm products are more differentiated and are often tailored to buyers' specific requirements. To meet the demands of these differentiated markets, farmers must provide extensive product information and, as a result, must invest in more monitoring and record-keeping technologies. Many of these changes stem from the efforts of processors and retailers to attract consumers through special product attributes and lower retail prices. Those efforts require control and monitoring throughout the many steps—known collectively as the supply chain—involved in producing and delivering products from the farm to consumers. Within the supply chain, formal contracts increasingly govern the transfer of farm products, replacing traditional cash transactions on the spot market. This report focuses on the use and impacts of agricultural contracts in evolving supply chains.

The use of agricultural contracts is controversial. Contracts may lead farmers to exchange price risks in the market for unexpected contract risks. Under some circumstances, contracts may allow buyers of agricultural commodities to exploit market power by deterring other buyers from entering a local market or by allowing the buyer to reduce prices paid in related spot markets. On the other hand, contracts frequently provide farmers with important benefits, such as reducing costs associated with uncertain income streams. They can facilitate the spread of new production technologies, including advances in genetics, feed formulations, nutritional services, fertilizers, and pest control. Contracts can lead to reduced processing costs and provide consumers more customized and affordable products.

Contracts are particularly controversial in livestock, where a few meatpackers handle most livestock purchases. In 1999, Congress passed laws requiring mandatory price reporting of livestock transactions in response to the loss of price information because of contracting. Several proposals to regulate livestock contracts were introduced in Congress during debates over the 2002 Farm Bill. In February 2004, a Federal jury in Alabama

concluded that Tyson Foods used contracts to lower cattle prices (with estimated damages to cattle producers of \$1.28 billion), a decision later voided by the judge in the case.

This report assesses what we know about agricultural contracting in the United States. It synthesizes existing analyses of its effects on risk, productivity, market power, and price discovery. This synthesis allows us to arrive at conclusions that no single or small set of studies could support. We also suggest areas where new research is needed to answer questions identified by the analysis.

Organizing Agricultural Production and Marketing

Contracts play an increasingly important role in organizing agricultural production (table 1-1). Farmers acquire inputs through a variety of commercial transactions. Assets may be purchased, but they are also frequently rented. Material inputs can be purchased or produced on the farm; for example, livestock producers can buy or grow feed, while crop producers can buy commercial fertilizers or apply livestock manure to fields. Farm operators and their families can provide labor and management, and the operators can hire additional labor. Operators may finance input acquisitions out of business profits or household savings, or they may borrow through loans from a variety of financial intermediaries. Some inputs can be financed through contracts in which the contractor provides inputs in exchange for an eventual product. For example, crop contracts may provide for the provision of seed or plants, fertilizer, and chemical inputs to the farmer, who later transfers the harvested crop to the contractor.

Table 1-1—A farm operator's tasks and decisions

Assembles farm inputs:

What inputs?	How?
Land	Owns, rents, or produces assets; buys materials (individually or through a cooperative venture), produces them on farm, or acquires them through contract; provides or hires labor and management services.
Equipment	
Energy; feed; water	
Chemicals	
Seedstock; genetics	
Labor; management	

Then applies inputs to stages of farm production:

To what stages?	How?
Site preparation	Operator applies directly, purchases through custom service, or obtains contract.
Planting; breeding	
Pest and nutrient management	
Harvest; removal	
Local storage and transportation	

And delivers farm products to downstream users

What users?	How?
Other farms	Sells through spot market, transfers through contract, or transfers between commonly owned units through vertical integration.
Intermediaries	
Processors	
Retailers	
Consumers	

Source: Authors' summary of text discussion.

Farm production has several distinct stages (see table 1-1) and each farmer can handle them differently. The farmer can carry out the tasks of each stage from site preparation through harvest (or slaughter or processing for livestock). He can also hire a custom service provider to take over one or more stages, or he can specialize in some stages, leaving other operators to carry out the remaining ones. Custom crop-service providers often level, till, or seed the soil, apply fertilizers or chemicals to crops, harvest, or provide local transportation. Custom livestock-service providers can be hired for breeding, manure management, feeding, and local transportation. Livestock producers often specialize in breeding stage or in feeding before slaughter. Similarly, floriculture operators can start new plants that are then transferred to others for further growing.

What Are Agricultural Contracts?

Farmers frequently use contracts to assemble inputs, arrange for custom services on the farm, and finance those actions. Contracts are increasingly used to arrange for the transfer of products off the farm to a variety of users. Farmers can transfer products directly to a processor, such as a meatpacker, a cheese manufacturer, or a tomato processor. They may also transfer to intermediaries such as grain elevators, livestock integrators, and produce packers, who classify and aggregate large volumes of farm products for shipment elsewhere. Farmers sometimes link directly to retailers, most commonly for fruits, vegetables, and horticultural products, and sometimes sell directly to consumers. The term “agricultural contracts” refers here to contracts used to arrange for the transfer of agricultural products from farms to downstream users such as processors, elevators, integrators, retailers, or other farms.

Our analysis focuses on the transaction through which a farmer and a downstream user arrange to transfer the farm product. We define four methods of organizing that transaction (table 1-2):

1. *Spot (or cash) markets*, are the traditional means of price transmission in agriculture, which developed around generic or perishable products produced on many farms of similar size but geographically dispersed. Farmers sold to buyers (wholesalers, processors, brokers, and shippers) who aggregated farm commodities, processed them into food products, and distributed the products to customers. Modern spot markets for farm produce are based on many earlier marketing innovations, including grading and weighing technologies, standards to allow aggregation of individual farm products into large volumes, and accounting and payments systems to route compensation back to individual producers after aggregated volumes are sold (Cronon, 1992).

In spot markets, farmers are paid for their products at the time ownership is transferred off the farm, with prices based on prevailing market prices at the time of sale, under agreements reached at or after harvest. Premiums might be paid for superior quality, based on factors observable at the time of sale. Farm operators control production decisions such as the types of farm inputs to buy, as well as when and how to apply them. Operators also make financing decisions (often in concert with their bankers) and arrange for selling their products, including finding a seller, determining a price, and delivering the product.

Table 1-2—Four ways to govern the exchange of products from farms to buyers

Form of governance	Who controls production decisions?	How is the farm operator paid?
Spot market	Farm operator controls assets and production decisions in agricultural enterprise.	Farm operator receives price for farm output, negotiated at time of sale just prior to delivery.
Marketing contract	Farm operator controls assets and production decisions in agricultural enterprise. Contract may specify output, quantities, and delivery timing.	Farm operator receives a price for farm output, negotiated before or during production of agricultural commodity.
Production contract	Contractor exercises control over some production decisions or farm enterprise assets. Contract specifies products, quantities, and delivery timing.	Farm operator is paid a fee for farming services rendered in the production of the commodity.
Vertical integration	Single firm controls assets and production decisions in adjacent farming and processing stages.	Farm operator-manager is compensated for skills and time.

Source: Authors' summary of text discussion.

Spot market exchanges continue to govern most transactions for farm products. But three alternatives—production contracts, marketing contracts, and vertical integration—govern a growing volume of transactions. We describe these alternatives as they relate to the control of farm production decisions and the manner in which farm operators are paid for farm products.

2. *Production contracts* detail specific farmer and contractor responsibilities for production inputs and practices, as well as a mechanism for determining payment. Under many livestock production contracts, the farmer provides labor, equipment, and housing while the contractor provides feed, veterinary and transportation services, and young animals. Production contracts often specify particular inputs, set production guidelines, and allow for the contractor to give technical advice and make field visits. This leaves the farm operator with less control over input choices. The farmer's payment is based on the costs of farmer-provided inputs, the quantity of production, or both. Contractors, not farmers, often retain ownership of the commodity during the production process. Because the agreement includes the earliest steps of production, these contracts are agreed to before production begins. [See Box 1: What Is in a Production Contract?]
3. *Marketing contracts* specify a price (or pricing mechanism) and an outlet for the commodity, under agreements set before harvest or, for livestock, before removal. The pricing mechanisms often limit a farmer's exposure to wide price fluctuations, and the contracts often specify product quantities and delivery schedules. The farmer owns

Box 1—What Is in a Production Contract?

Some production contracts are quite simple—a few pages—while others are much longer and quite detailed. Common features like compensation rules can take many forms. However, production contracts frequently have the following components:

Assignment of Responsibilities—Production contracts are often quite specific about the roles of participants. Farmers in livestock contracts typically provide labor, housing, utilities, and on-farm structures and equipment. Contractors provide young animals, feed, and medication. The contract specifies responsibility for livestock transportation to or from the farm. In recent years, livestock contracts have included detailed guidelines for manure treatment and disposal. Crop contracts specify the inputs, such as seeds, that the contractor will provide the grower, as well as grower practices to maintain the integrity of the product.

Assignment of Products—Contract feeding produces market-ready animals, but also some dead ones (most processes carry a mortality risk) and animal waste (manure). The contractor usually retains ownership of the animals throughout the process, while growers are responsible for disposal of dead animals. Animal wastes may have economic value as fertilizer, or can be a liability requiring proper disposal, and contracts assign specific responsibilities for waste handling.

Compensation—Rules are rarely simple. Most livestock contracts specify a base pay, on a per animal or space basis. Contracts frequently contain incentive clauses, under which growers earn more if mortality rates are low or if they are relatively efficient in the use of feed or (less often) fuel. Crop contracts specify a base pay, and may contain production risk-control features. Contracts establish standards for product quality and specify penalties for failure to reach the standards.

Contract Length—Many crop-production contracts hold for a growing season. Livestock contracts can range from one flock (less than 2 months) to 10 years, and some livestock contracts are automatically renewed unless cancelled.

Delivered quantities—Most contracts contain estimates of the likely annual production, specify estimates of delivery times and quantities through the year, and set rules for handling departures from those estimates.

the commodity during production and retains substantial control over major management decisions, with limited direction from the contractor. [See Box 2: What Is in a Marketing Contract?]

4. *Vertical integration* combines the farm and the downstream user under single ownership—a firm that produces an input itself is said to be vertically integrated (Carlton and Perloff, 2004). For example, many wineries own and operate vineyards, while citrus processors

Box 2—What Is in a Marketing Contract?

Farmers retain far more control over their production process in marketing contracts, and such contracts are hence often shorter and less prescriptive than production contracts. Key elements include:

Delivered quantities—Marketing contracts contain estimates of the likely annual production under the contract and of delivery times and quantities through the year. Livestock contracts contain greater detail for delivery cycles, dates, and quantities. Some marketing contracts specify the share of the grower’s output (often 100 percent) that must be delivered.

Product Specification—Some agreements specify the precise genetics for a product, and also set standards for a grower’s production methods and physical equipment.

Compensation and Quality Control—Under some marketing contracts (called marketing pools), groups of farmers commit specific quantities to an intermediary contractor who then negotiates a price with downstream users on their behalf. But most marketing contracts designate a base price or pricing formula, with risk adjustments designed to reduce the variation in contract prices compared with spot market prices. The base price formula can link a price to a spot or futures market price for the commodity, to a price for a related commodity (such as a wholesale price for a food product containing the agricultural commodity), or to a cost formula (such as feed prices for livestock). Contracts for homogeneous products specify minimum acceptable quality standards, while others establish schedules for quality-based price premiums or discount from the base.

may own and operate orange groves and meatpackers may own hog farms or cattle feedlots. Product transfers are made not through contracts or spot market arrangements, but through internal decisions. Farm operators in vertically integrated firms hold employment rights and are compensated like other employees.

Contracts, spot markets, and vertical integration are three ways to organize the *vertical coordination* of products and services through the supply chain. “Coordination” refers to harmonizing the stages of a supply chain, from scientific development and manufacture of new farm inputs through farm input acquisition and production, to processing and retail distribution, to delivery of final products to consumers. “Vertical” refers to the sequential nature of those steps (table 1-1). Vertical integration makes the coordination between stages explicit and dependent upon a set of decisions within the firm, while spot markets achieve coordination implicitly, through prices for products and services. Contracts coordinate through a combination of prices and explicit rules for production decisions, timing, and compensation.

Methods of vertical coordination change over time and vary across commodities. For example, today’s farms are often more specialized, and less vertically integrated, than those in the past. Farms that produce their own feed for animals that they raise to slaughter weight are vertically inte-

grated. However, a livestock producer may specialize in raising livestock only, buying feed through a market instead of producing it on the farm, and selling manure instead of applying it as an input to crop production. Crop producers may purchase many custom services, such as harvesting, instead of performing the services themselves. Farmers may do less on-farm processing, and they may buy seedstock or animal genetics (semen) rather than saving seed or keeping a bull for breeding. Each of those choices represents a shift toward reliance on outsourcing through cash or contracts, and a reduction in vertical integration.¹

¹ There is also some evidence that vertical integration between downstream users and farming is declining. The Census of Agriculture reports on the number of farms owned by nonfamily corporations with more than 10 shareholders, and the value of production on those farms. That measure is a good indicator of farm production by large public corporations such as meatpackers or fruit processors, who source some of their agricultural needs. Such firms owned 1,075 farms in 2002 (0.05 percent of the total), accounting for 1.9 percent of all farm production, down from 3.0 percent of production in 1978.